

every feature of the invention specified in the claims. However, Applicants' respectfully traverse this objection and point the Examiner to Figures 1A and 1B and page 11, lines 22-24 and page 12, lines 1-2 of the specification. Applicants' drawings and specification clearly show the first thickness of the arcuate section (12b) as it relates to the second thickness of the side wall sections (12a) and as it further relates to the third thickness of a thin side wall section (12c). Accordingly, this objection should be withdrawn.

Claims 4, 6, 7, 9 and 12 have been rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Claims 4, 6, 7, 9 and 12 have been amended to overcome the informalities noted by the Examiner. Accordingly, this rejection should be withdrawn.

Claims 1-13 have been rejected under 35 U.S.C. §103(a) as being obvious over Applicants' Prior Art in view of Nobuaki, Japanese Patent Application No. 09-238400 ("Nobuaki").

The rejection is respectfully traversed, and reconsideration is requested.

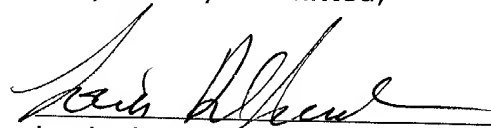
Claims 2, 3, 4, 5, 6, 8, 10, 11 and 12 depend from independent claims 1, 7, and 9. Independent claims 1, 7, and 9 and therefore claims 2, 3, 4, 5, 6, 8, 10, 11 and 12, have been amended to recite that the first and second case unit wall sections are continuous. This feature is not disclosed or suggested by either of the cited references. Accordingly, claims 1-13 are not obvious over Applicants' Prior Art

in view of Nobuaki, and this rejection should be withdrawn.

CONCLUSION

It is believed, for the foregoing reasons, that the claims warrant allowance, and such action is earnestly solicited.

Respectfully submitted,

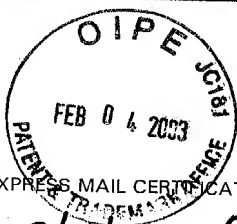


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PATENT TRADEMARK OFFICE

Docket No: 9613/OL088

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Masaaki Takagi; Toshio Sadamitsu; Katumi Saitou

Serial No.: 09/905,000

Art Unit: 2834

Confirmation No.: 3447

Filed: 07/13/2001

Examiner: Heba Elkassabgi

For: CLAW POLE PERMANENT MAGNET STEPPING MOTOR

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MARK-UP

Hon. Commissioner of
Patents and Trademarks
Washington, DC 20231

February 4, 2003

Sir:

1. (Amended) A claw-pole permanent magnet stepping motor, comprising:
a first case unit having a length wherein said first case unit is continuous along its length;
a second case having a length wherein said second case unit is continuous

along its length [unit aligned with said first case unit];

said first and said second case units having a total length;

a rotor having at least a first and a second permanent magnet;

said first and said second case units having a shape supporting said rotor;

a third and a fourth arcuate section on each said first and said second case units;

a fifth and a sixth side wall section joining each respective said third and forth arcuate sections in a continuous flattened-oval section about said rotor;

said third and said forth arcuate sections each having a first diameter; and

a ratio of said total length to said first diameter is at least 1:1, whereby said claw-pole permanent magnet stepping motor has a reduced size, eliminates magnetic circuit obstructions, and prevents external flux leakage to allow use with magnetic devices while providing an adequate rotational torque.

4. (Amended) A claw-pole permanent magnet stepping motor, according to claim 3, wherein:

said fifth and said sixth wall sections each having a planar shape and being closer to said rotor than said third and said fourth arcuate sections; and

said at least first case unit having a flattened-oval cross section, whereby said claw-pole permanent magnet stepping motor has a reduced size.

6. (Amended) A claw-pole permanent magnet stepping motor according to

claim 2, further comprising:

- a first metal bearing in said first case unit;
- a second metal bearing in said second case unit;
- said rotor supported between said first and said second metal bearings;
- a plurality of magnetic poles on said first and second permanent magnets;
- a first and a second phase inductor in each respective said first and said second unit case opposite each respective said first and second permanent magnets;
- said first and said second phase inductors disposed symmetrically in each respective said first and said second case units; and
- said first and said second phase inductors each formed from at least a first and a second magnetic plate each including multiple claw-poles and a first and a second coil each with a set of connectors, whereby said adequate rotational torque is created.

7. (Amended) A claw-pole permanent magnet stepping motor, comprising:

- a first case unit having a length wherein said first case unit is continuous along its length;
- a second case having a length wherein said second case unit is continuous along its length; [unit aligned with said first case unit]
- a first and a second case unit having a total length wherein a material forming said first and second case units is magnetic;

[said first and said second case units including a magnetic material;]
a rotor having at least a first and a second permanent magnet;
said first and said second case units having [a] an oval shape supporting said rotor;
a third and a fourth arcuate section on each said first and said second case units;
a fifth and a sixth side wall section joining each respective said third and forth arcuate sections in a continuous flattened-oval shape about said rotor;
said third and said forth arcuate sections each having a first diameter;
said total length and said first diameter having a ratio of at least 1:1;
said third and said fourth arcuate sections each have a first thickness;
said fifth and said sixth wall sections each have a second thickness;
said first thickness being greater than said second thickness;
said fifth and said sixth sections each having a planar shape and being closer to said rotor than said third and said fourth arcuate sections;
said at least first case unit having a flattened-oval cross section, whereby said claw-pole permanent magnet stepping motor has a reduced size, eliminates magnetic circuit obstructions, and prevents external flux leakage to allow use with magnetic devices while providing an adequate rotational torque;
a first metal bearing in said first case unit;

a second metal bearing in said second case unit;
said rotor supported between said first and said second metal bearings;
a plurality of magnetic poles on said first and second permanent magnets;
a first and a second phase inductor in each respective said first and said second unit case opposite each respective said first and second permanent magnet;
said first and said second phase inductors disposed symmetrically in each respective said first and said case units; and

said first and said second phase inductors each formed from at least a first and a second magnetic plate each having multiple claw-poles and a first and a second coil each with a set of connectors, whereby said adequate rotational torque is created.

9. (Amended) A claw-pole permanent magnet stepping motor, comprising:

[a first and a second case unit;]

a first case unit having a length wherein said first case unit is continuous along its length;

a second case having a length wherein said second case unit is continuous along its length; [unit aligned with said first case unit]

said first case unit and said second case unit having a first total length wherein a material forming said first and second case units is magnetic;

a rotor including a first and a second permanent magnet;

[said first and said second case units including a magnetic material;]

said first and said second case units having [a] an oval shape supporting said rotor;

a permanent magnet magnetized to form a plurality of poles;

said permanent magnet on said rotor [roter];

a first phase inductor;

a second phase inductor;

said first and said second phase inductors disposed symmetrically in each respective said case unit;

said first and said second phase inductors each including at least a plurality of claw poles and a coil;

said first and said second case units having a first diameter; and

a ratio of said first total length to said first diameter is at least 1:1, whereby said claw-pole permanent magnet stepping motor has a reduced size, eliminates magnetic circuit obstructions, and prevents external flux leakage to allow use with magnetic devices while providing an adequate rotational torque.

12. (Amended) A claw-pole permanent magnet stepping motor, according to claim 11 wherein:

each said first and said second phase inductor includes said coil and a magnetic plate formed integrally from a magnetic material;

each said magnetic plate having [a] an oval shape, including a flat oval-shaped

section and an extending plurality of claw-poles, for sliding insertion in each respective said first and said second case unit, whereby assembly time is reduced and efficiency increased.